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UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
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LIVING WITH THE CORN BORER
(Infested Areas)

Anytime, week of March 19.

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NOT FOR PUBLICATION

ANNOUNCEMENT: One of the annoyances of LIVING WITH THE CORN BORER--which is the disagreeable lot of the farmers of this region--is that the borer has more disguises than Old Sleuth himself and just as many possible hiding places as there are pieces of corn plant about the farm. For today's radio contribution to the spring campaign against the borer, Station ____ has secured from a specialist of the U. S. Department of Agriculture a word-picture of the form that the insect pest takes just now in its winter lairs, and an explanation of how to keep the tribe from increasing by destroying those lairs.

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Out in the fields of stubble or stalks, and in the corn stalks, cobs, and ears about the barn yards and feed lots of farms in corn borer infested regions the vanguard of the 1928 army of corn borer vandals has camped through the winter.

The individual members of this army at this time of the year are fully grown caterpillars, each nearly an inch long and 1/8 of an inch thick. Their heads are dark brown or black. Colors of the upper surfaces of their bodies range from light brown to dark brown and to pink. Each division of a borer's body bears a row of small dark brown spots, and lengthwise of the body extend several dark brown or pink lines. The under side of the body is flesh colored.

These guerillas of the insect tribe have spent the winter in tunnels within corn stalks, corn cobs, or corn stubble. Small holes, usually plugged with the castings of the borer, appear on the surface of the plant to betray the entrances to the tunnels. Split open a stalk, a piece of stubble, or an ear bearing these tell-tale holes and almost invariably borers will be found.

Each of the borers surviving the spring clean-up will become a moth next June. The average moth will lay some 400 eggs which will hatch into borers. About 60 of each 400 will enter corn plants to join the myriads of borers which will take toll of this year's crop.

Last week's corn borer broadcast from Station _____ described methods of clean plowing which have been found successful in killing off a large part of the spring vanguard of the borer army. This week we'll discuss

ways and means of destroying borers which have overwintered in barnyards and feedlots. Let's just outline here the main points to be talked over. I'll put them as questions:

1. Does the borer live through the winter in corn silage?

2. Is the feeding of infested corn stalks an effective control?

3. Does the borer live in cornstalks trampled in manure?

4. Are cornstalks around the barnyard likely to shelter borers?

5. How can cornstalks around the barnyard be disposed of to kill the borers?

And here are the answers:

First, THE SILO SPELLS SURE DEATH TO THE BORER. Borers escaping the silage cutter are killed in the fermentation process. To insure a good kill in the silage cutter farmers cut the stalks in pieces not more than one-half an inch long. This is especially important when for any reason the silage is not placed directly in the silo or is not fed soon after treatment. To obtain best results in the way of corn borer control from ensiling corn the infested plants are cut as close to the ground and as early in the season as possible.

Making corn into silage is one of the best solutions of the problem of getting along with the borer. Farmers who ensiled corn last fall have much less spring clean-up work to do.

Second, feeding infested corn fodder to livestock is one of the most effective methods of fighting the pest. It also is a desirable farm practice. Except in cases of very bad infestation, the borers do not noticeably injure the food value of the fodder.

Feeding as finely cut, finely ground, or finely shredded fodder is the most effective practice. Running fodder through a husker-shredder machine kills from 98 to 100 per cent of the borers and at the same time makes the fodder more acceptable to the livestock. Tests have shown that good results follow the use of several types of shredders equipped with shredder heads, cutter heads, or combination shredder and cutter heads. Highest efficiency in killing borers comes from taking special care to apply sufficient pressure on the snapping rolls to produce a crushing effect and prevent long pieces of the fodder from being whirled through the head without being finely cut or shredded.

Most of the borers that escape death in the machine perish during the process of storing the shredded material, feeding it to livestock, and using the residue as bedding which is trampled into the manure.

The ordinary cutting box has not proved very effective for borer control, even when adjusted so as to cut the stalks in pieces not more than one-half inch long.

Third, borers do not live in cornstalks completely trampled under and covered with manure. Experiments on infested farms have shown in general that practically all corn borers perish when infested corn stalks or other corn remnants are covered by wet manure to depths ranging from 10 to 12 inches, or when such infested material is covered completely by lesser quantities of manure and trampled by livestock.

But it should be remembered that large numbers of the borers will survive in any pieces of corn stalk left sticking out of the manure. Borers crawl to the surface from submerged stalks and take refuge in exposed pieces of plant material. Hence, large uneaten pieces of corn fodder should ordinarily be kept off the manure unless they will be trampled by livestock or it is possible to work them deeply into the manure.

Fourth, IF your corn was all ensiled: IF it was all shredded; IF it all has been trampled deep below the surface in the barnyard muck; and IF there are no pieces of cornstalks or cobs about your barnyard or feed lots, this answer won't interest you. Probably, however, one of the IF's finds your barnyard or feed lot wanting, so you'll be interested to know that it is dangerous where conditions are favorable for the corn borer, to allow cornstalks and cobs to accumulate around the barnyard or feed lot. An examination of the cornstalks in the barnyards and on the surfaces of manure piles of typical farms in Lucas county, Ohio, last spring showed as many as 256 borers in 1,000 feet of cornstalks.

Trampling, freezing, and the ordinary wear and tear on stalks in the barn-yard does not kill many of the borers. They will take shelter in the corn remnants left about and large numbers will produce moths which will fly forth in June to lay the eggs from which the 1928 pests will hatch.

Fifth, and finally, the best way to lower the hazard represented by stalks around the barnyard and feed lot is ----BURNING. No borer survives a good burning. This is the surest control method. The stalks, cobs, husks, and other pieces of plant material can be raked into a pile and burned as soon as they are dry enough.

The important thing to remember is this:

BEFORE THE MOTHS EMERGE ALL CORN REFUSE ABOUT, BARNYARD, OR FEED LOT MUST BE CLEANED UP. MAY FIRST IS A GOOD, SAFE DATE. THE CLEAN-UP SHOULD NOT BE DELAYED PAST JUNE 1.

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UNITED STATES DEPARTMENT OF AGRICULTURE — Radio Service — OFFICE OF INFORMATION

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LIVING WITH THE CORN BORER
(Infested Areas)

RELEASE #4, Week of Mar. 26

(NOT FOR PUBLICATION)

ANNOUNCEMENT: Three months from now there will be abroad in our corn fields the plague of corn borer moths which lay the eggs from which the 1928 army of corn-destroying insects will hatch. Today, in the fourth of nine weekly 10-minute periods which Station _______ is setting apart for discussing farming problems of LIVING WITH THE CORN BORER, a U. S. Department of Agriculture specialist will explain one of the methods of killing the borers now before they turn into moths. I'm going to put some questions to Uncle Sam's insect fighter, and the first one is:

ANNOUNCER: How does the corn borer spread naturally?

EXPERT: The corn borer army uses modern methods of attack. It flies into new territory. Nearly all spread of the borer by natural means takes place during the 3 or 4 weeks in June and July during which the borer moths are flying and laying the eggs which become borers to prey upon corn. These moths fly great distances; some of them, marked for identification, have been found as much as 20 miles from places where they were liberated.

ANNOUNCER: How long does a corn borer moth continue its operations?

EXPERT: The average life of borer moths ranges from 14 to 20 days. In this time it may lay eggs, starting a new generation of hungry young borers, over wide areas. How far it will range and in what directions are largely governed by the direction and velocity of the winds, especially the night winds, during the moth stage.

ANNOUNCER: What other means besides the dispersion of the moths will carry the borer into new territory?

EXPERT: Rivers and streams may carry plant material containing live borers. During flood seasons large quantities of old cornstalks are carried down stream from infested areas, and lodge on banks in "clean" territory. To keep down spread by this means, the federal government carries on careful scouting and thorough clean-up along all river valleys leading out of infested areas.

ANNOUNCER: Since the moths of the corn borer carry the new generation which will damage corn this season, why not trap them when they fly next June?

EXPERT: When the fight on the corn borer started, that idea occurred to a number of persons. It was thoroughly tested out, but no sort of trap has

been found that will give control of the borer. The first type of trap tried was the light trap, which was designed to lure the moths with a light. This is one of the oldest methods used in trying to control insect pests, but it never has been successful in combatting any pest.

In the corn borer region federal and state specialists tried lights of different types and colors: gasoline and kerosene lanterns, acetylene lights, and electric lights of white, yellow, blue, green, red, and violet. The experiments were carried out in fields where moths were known to be numerous, and at the time of greatest activity of the insects. But very few moths were attracted to the traps, no matter what sorts of lights were used.

Repeated tests wound up with the disappointing result of less than 1 per cent of the total corn borer moths in any one vicinity attracted to light traps. Take this example: at Monroe, Mich., in the corn borer moth season of 1927, a trap highly recommended by the manufacturer was set for five nights. During that time it caught 30 female and 20 male borer moths. In the same 4-acre field, scouts collected 1,000 egg masses.

ANNOUNCER: Well, how about bait traps?

EXPERT: No luck there, either. All sorts of baits have been tried. Various syrups, fresh and decaying fruit, honey, stale "near beer" and various aromatic oils each drew a few moths where tests were made. But none attracted a large enough number of the moths present in any field to offer promise of control.

ANNOUNCER: It seems, then, that the best time to destroy the borer is fall, winter, and spring, when it is inactive inside waste corn material.

EXPERT: Exactly. The borer is a moth for only 3 or 4 weeks, but it is a caterpillar inside the corn stalk or cob for 7 months. While it is a moth it is a highly mobile insect, hard to catch, and therefore hard to destroy. While it is a caterpillar it succumbs when its harboring places are destroyed.

ANNOUNCER: Now then, suppose you tell us about the handling of stubble fields for control of the corn borer. First, how high can the stubble be left without endangering the success of control work?

EXPERT: Stubble should not be left more than 2 inches high for good borer control. High stubble contains much of the borer population. Even in fields of comparatively low percentage of infestation, an alarming number of borers is left in the stubble, as it is the tendency of the insect to tunnel down toward the root in the fall to reach the more moist part of the stalk.

The simplest way of destroying borers in the spring is plowing under the stubble completely, leaving not a shred of stalk, cob, or leaf on the surface. Clean plowing, wherever it is possible, makes an effective control.

ANNOUNCER: But will disking a stubble field destroy the borer?

EXPERT: Absolutely not. In fact if you disk in stalks or high stubble in preparation for sowing small grain, the operation means the beginning of encouraging conditions for the growth of corn borers. The shade from the growing grain will furnish protection to the borers in the stubble and stalks about the field. Experiments bearing on this point of shade protecting borers have been made. They showed that during periods of high temperature or drought in the late spring borers in trash scattered about fields planted to corn and sugar beets had a much lower mortality than borers in fields not so planted.

ANNOUNCER: What control measures besides clean plowing can be used on a stubble field?

EXPERT: Stubble beaters, if field conditions are favorable, kill from 95 to 97 per cent of the borers.

ANNOUNCER: And what is a stubble beater, where can it be operated and how may one be obtained?

EXPERT: A stubble beater is a light piece of machinery, drawn by a tractor. It pulverizes stubble with short, loose, knives revolving at the rate of 1500 revolutions per minute. It gives excellent results on stubble not more than 10 inches high. It's not satisfactory when used on unattached stubble, on attached stubble in closely spaced rows, on very rough or stony ground (such ground breaks or bends the blades), or in regions where weeds carry important numbers of borers. The United States Department of Agriculture bought 800 stubble beaters for last spring's campaign. Now it is making them available to farmers in the infested area who want to use them.

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LIVING WITH THE CORN BORER
(Infested Areas)

Week of April 2

NOT FOR PUBLICATION

ANNOUNCEMENT: It takes more than the presence of an insect pest to dishearten American farmers. The March surveys of intentions to plant corn indicate larger acreages than last year's in states invaded by the corn borer, and in other corn growing states. Dependence evidently is being placed in clean-up and quarantine to keep the whip hand over the borer. Station _______ therefore has secured explanations of the quarantine and timely tips on clean-up for this week's discussion of how we are learning to LIVE WITH THE CORN BORER.

---ooOoo---

There is no immigration quota for members of the race, Pyrasta nubilalis. And descendants of members of this tribe which have reached this country from the Old World are confined as closely as possible to the regions where they have established residence.

Which is to say that the European corn borer (scientific name, Pyrasta nubilalis) is barred from entry into this country in shipments of plants or plant products, and from travel out of infested areas within the country in similar shipments.

There are two Federal quarantines against the corn borer now in force--a foreign and a domestic. The foreign quarantine prohibiting the entrance of any plant products likely to contain the pest has been strictly enforced at all points of entry since 1921 by the Federal Horticultural Board. Since 1920 the domestic quarantine has been in force. It prevents the movement of all infested material into "clean" territory, and is enforced by the Bureau of Entomology in cooperation with the Federal Horticultural Board and the various States affected. Many of the states have their own quarantine regulations, in addition.

The products under quarantine vary in different parts of the country. In the Great Lakes region they are all parts of the corn plant, broom corn, sorghums, and Sudan grass. This quarantine applies the year around. None of these products can be moved out of the infested area, or reshipped, even if grown outside the area, unless a certificate of inspection is obtained from the quarantine authorities.

An additional quarantine, effective between the dates of June 1 and

and December 31 each year, is laid in eastern Massachusetts, New Hampshire, Maine, Rhode Island, Connecticut, and Fishers Island, New York, on the following: Celery, green beans in the pod, beets with tops, rhubarb, oat and rye straw as such or when used as packing, cut flowers and entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock, gladiolus, and dahlia.

The question of course comes up at once, How effective has the quarantine been in preventing spread of the corn borer?

The borer fighters reply that, due to the quarantine restrictions, long distance spread by artificial means has been practically eliminated. In several cases badly infested green corn, bound for Iowa and other parts of the Corn Belt, and even for Florida, has been intercepted. In no case has a serious infestation of corn borers been built up in an area isolated from the main infested regions. Of course quarantine has no effect on the natural spread of the borers by flight of the moths, winds carrying moths or infested pieces of the corn plant, and streams bearing infested stalks down stream on flood waters.

Now for a look around at the spring work which remains to be done to complete the clean-up and kill corn borers before they emerge from last year's stalks and cobs to fly as moths and lay the eggs which will produce the 1928 crop of pests.

A question which is frequently asked is whether or not living corn borers are found in shelled corn or in ear corn stored in cribs.

The borers overwinter in corn cobs, not in the corn grain. Therefore shelled corn intended for shipment out of the infested area must be certified free of cobs and debris capable of carrying the corn borer in order to meet quarantine requirements.

The process of shelling does not ordinarily kill the borers contained in the cobs. Hence, all cobs about farms in the infested areas should be burned before June 1. Furthermore, all corn from infested fields should be shelled not later than June 1 so that the cobs may be burned. When it is impossible to shell the corn and burn the cobs before June 1, the ear corn should be placed in a tight container, or covered by a wire screen with at least 12 meshes to the inch, in order to prevent the escape of emerging moths.

Another source of possible reinfestation of this year's corn crop is cornstalks stored in barns. Some of the borers brought in from infested fields in such stalks may die as a result of the drying out of the stalks during the winter, but in order to keep the number of moths flying in June to a low enough number to prevent commercial damage to this year's crop, all the stalks should be taken out and burned, or finely cut or shredded before June 1. To kill borers by cutting, the cutter should be adjusted to cut the stalks into

pieces not more than one-half inch long.

These two measures--shelling infested ear corn and burning the cobs, and burning, shredding, or finely cutting infested stalks stored overwinter, are important side-line activities of the clean-up. Of course the principle back of these and all other control measutes is to get rid of all remnants of last year's corn crop which may contain the hibernating borer. The main operations which will accomplish this result are clean plowing which leaves no stubble or stalk fragments on the surface of the fields; ensiling, finely cutting, grinding, or shredding fodder, and feeding it to livestock; collecting fragments of stalks, leaves, and cobs about the fields, feed lots, and barnyards, and burning them; and, at harvest time in the fall, low cutting to leave a stubble less than 2 inches high.

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ANNOUNCEMENT: Next week at this period, listeners of Station ______ will learn the results, to date, of attempts to find a parasite of the corn borer which will cut down the numbers of the pest.

UNITED STATES DEPARTMENT OF AGRICULTURE
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LIVING WITH THE CORN BORER
(Infested States)

Week of April 9

NOT FOR PUBLICATION

ANNOUNCEMENT: Why doesn't someone find a short-cut to control of the corn borer? That question, which continually crops up, will be answered, for the present, at least, in today's contribution from the U. S. Department of Agriculture to the program of Station ________.

---ooOoo---

Probably everyone interested enough in the problem of corn borer control to follow a series of radio talks about it knows that other threatening insect pests have been brought under control simply by setting insect "watch dogs"--parasites--upon them.

Farmers generally remember the spectacular success which entomologists scored in California some years ago. The scientists tackled the problem of controlling the fluted scale which threatened to wipe out the orange and lemon industry of California. The fluted scale came from Australia. There the ladybird beetle preyed upon the scale. Ladybird beetles were brought to Los Angeles and liberated upon orange trees there. Within a year the orange trees were in bloom and within 5 years the fluted scale problem was a thing of the past.

Presto, change! Just like that.

Why not clean up the corn borer in the same way?

In reply, the scientists working at the problem of corn borer control assure us that they are trying to control the corn borer with parasites, but that parasites alone will not keep down the borers.

"Even with the best of success, judging from previous experience," they say, "it is not likely that important effects of parasites can be expected until several years hence. In the meantime the practical and effective methods of corn borer control will continue to be feeding corn fodder to livestock, raking and burning, or completely plowing under all the previous year's cornstalks and crop remnants before June 1 of the following year.

The work which has so far been accomplished toward corn borer control by parasites sums up about as follows:

Three different kinds of native insects have been found to prey upon

the borer in the Great Lakes area, and 18 native parasites of the borer are known in New England. BUT, all of these parasites together are able to kill an average of only 1 per cent of the borers.

In favorable years a certain wasp-like native insect destroys a considerable number of the corn borer eggs, but its activities vary so much from year to year that it can't be relied upon. Birds sometimes feed upon corn borers, but with the exception of somewhat local feeding by woodpeckers, birds are not known to have an important influence in reducing the number of corn borers in the United States.

Trying to repeat the success of the campaigns against the fluted scale, and the less complete triumph over the Gipsy and brown tail moths, the scientists have imported from the original sources of the corn borer--certain European countries--12 species of parasites.

Seven of these species in New England, and three in the Great Lakes area are now known to be preying on the borer. As the borer was first discovered in Massachusetts, the work has been going on longer there than in any other infested state. The first imported parasites came to Arlington, Mass., nearly eight years ago--in 1920. Before these insects were brought over to this country, they were studied in their European haunts to make sure that they would not harm plant growth. After reaching this country the parasites again were studied in laboratories so that it would be absolutely certain that they would not themselves become plant scourges. Then they were liberated.

To the present, parasites have been liberated at favorable points in each of the five corn borer States in the Great Lakes area, also in New England, and at the site of an isolated corn borer infestation near Sherburnville, Ill. Altogether, 1,798,080 individual parasites have been sent out into the infested fields to attack the crop destroyer. The places at which the different species were sent into action were chosen with an eye to finding conditions as nearly as possible like those in the native habitats of the insects. Parasites have been liberated at Richmond, Monroe, and Erie, Michigan; at Bono, Sandusky, and Mentor, Ohio; Silver Creek, New York; Mill Creek, Pennsylvania; St. Joe, Indiana; and at eight places in Massachusetts.

Last season's report on this phase of the corn borer campaign showed that less than 1 per cent of the borers now are being killed by these parasites. The results, however, have been encouraging considering the length of time it takes to establish a parasite under new conditions.

Some other short cuts to corn borer control, besides the introduction of parasites have been tried. Probably every known method of controlling insects has been experimented with since 1918 when the borer was first discovered to be a menace to the corn crop.

Insecticides have so far failed because the borer insists on living inside the corn stalk and won't come out to be sprayed.

Moth traps--either light or bait--won't attract a sufficient number of the borer moths to bring about control.

Parasites, which have been studied and imported since 1920, are not yet a decisive factor, and apparently they won't be for some time to come.

We come back to the hard fact that the only known method of killing enough corn borers to keep down the insect's damage is attack upon it during its inactive, hibernating season, by mechanical means.

The mechanical control is brought about by plowing the stalks completely under, feeding fodder to livestock, shredding, burning, or completely disposing of the crop remnants so as to kill the borers.

Plowing controls when no pieces of plant material are left on the surface. The borers will crawl to the surface from some of the buried stalks, but if the surface is clean they find no shelter there, and die from exposure or the attacks of their natural enemies.

Putting corn into silos kills the borers, as they cannot stand the fermentation process through which the ensilage passes.

Shredding or cutting into less than half-inch lengths kills practically all the borers.

Feeding the corn plant directly to livestock is a good control measure when care is taken to dispose of all scraps left about the barn or fields.

Burning must be resorted to in order to dispose safely of pieces of the corn plant not otherwise handled in a way to kill the borers.

When all of the previous year's corn crop is properly disposed of before June 1, 95 to 98 per cent of the corn borers are killed.

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LIVING WITH THE CORN BORER
(Infested States)

Week of April 23.

(NOT FOR PUBLICATION)

ANNOUNCEMENT: Plow and burn! Those are the orders of the day in the fight against the corn borer. They are the imperative things. But let's relax just now for about 10 minutes and talk over with U. S. Department of Agriculture specialists the research work which developed the control methods now used, and the investigations which are now going on in this all-important branch of corn borer control work. Station _____ has secured answers to pointed questions about this vital subject. Here's the first one:

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QUESTION: How long have American scientists been studying the European corn borer?

ANSWER: Since the discovery, in the summer of 1917, of the corn borer, in the vicinity of Boston, Massachusetts, scientists of this country have studied the insect and tried out methods of controlling it. As this undesirable alien has been found at points nearer the Corn Belt, efforts to find means of halting it have doubled and redoubled. Some of the milestones along the way of the borer's westward march are these: The discovery during the latter part of September, 1919, of an infestation on a farm in Erie county, New York; the findings, in August, 1920, of corn borers in Welland, Middlesex, and Elgin counties, Ontario, Canada; the definite knowledge, by the close of 1924, that the insect was present in practically all of the territory along the shores of Lake Erie, and a short distance inland.

QUESTION: Well, how do the Federal and State workers go about keeping down the corn borer?

ANSWER: The work is carried on in three divisions: First, scouting to locate unknown or newly infested areas, and to fix the boundaries of areas already known to be infested; Second, quarantine to keep products infested with the borer from being transported into clean territory; Third, clean-up work to reduce the numbers of the pest in badly infested areas, or to keep down infestations that are especially dangerous because of their locations or other characteristics.

QUESTION: What's the net result of the investigations into clean-up problems--what methods have been found effective in controlling the corn borer?

ANSWER: In a nutshell, here's the result: MECHANICAL METHODS OF KILLING THE BORERS IN CORN STALKS AFTER THE CORN HAS BEEN HARVESTED ARE THE MOST EFFECTIVE AT PRESENT. The borers can be destroyed by burning stalks and other plant material, by feeding to livestock, by shredding or ensiling, or by any other method which completely destroys remnants of last year's corn crop. If all these remnants are destroyed before June 1, the borers over-wintering in the stalks

are killed. The June 1 date is important, because in June the borers change into moths which fly about laying the eggs that produce the current year's crop of borers.

QUESTION: The farmer's own ingenuity helps quite a bit in corn borer control, doesn't it?

ANSWER: Certainly the individual carrying on the control work has a chance to figure out the best methods of doing what has to be done. An instance of Yankee inventiveness finding the most practical way to keep down corn borers comes from Eden Valley, New York, a vegetable gardening district. There the growers use a common disk in control work.

After harvesting their corn and removing the stalks from the field, Eden Valley growers work over the fields with a disk, chopping up and driving into the ground a good part of the stubble. Next they plant a fall crop of rye. The following spring they plow the rye under.

This plan, say the growers, buries the stubble beyond danger of its being uprooted, and also, through the plowing under of the green rye, adds humus to their land.

Eden Valley is in the heart of Erie County's worst infested area. Sweet corn, which is even more susceptible to corn borer damage than field corn, is grown there in great quantities. But the local farmers have found that their unique method of fitting their fields has got the corn borer pretty well under control.

QUESTION: It's good to know that ordinary farm machinery can be used in borer control. But tell me, what work have the research men done on special control machinery?

ANSWER: The State Experiment stations, the United States Department of Agriculture, and farm machinery manufacturers all have been trying to develop more practical and effective machinery. Several reliable home-made devices, such as the stalk shaver, have been worked out. Directions for building this little machine can be obtained from the Ohio Extension Service at Columbus, or the European Corn Borer Control headquarters at Toledo, Ohio.

The low-cutting attachment for corn binders worked out last year makes it possible to leave stubble less than 2 inches high, which is satisfactory for corn borer control. The stubble beater, a light machine for pulverizing stubble, drawn by a tractor, has been found practical for operation in smooth fields where the stubble is less than 10 inches high.

QUESTION: But are we always going to be obliged to follow these laborious methods of corn borer control? How about finding corn varieties which will resist borer attacks? Or quick-maturing varieties which can be planted late enough to escape corn borer damage?

ANSWER: No one can say exactly. Studies are now being carried on to determine the effect of time of planting on the corn borer, and efforts are being made

to develop resistant and tolerant varieties of corn. But the results so far do not warrant widespread use of these methods of control.

QUESTION: Where are the studies being made?

ANSWER: The United States Department of Agriculture, in cooperation with the Ohio Experiment Station, is conducting work of this sort at Bono, Ohio; and, in cooperation with the Michigan Experiment Station, at Monroe, Michigan. Several other infested States, and some of the States bordering on the infested regions also are doing experimental work on these problems.

QUESTION: How long will research work be carried on---is it necessary to continue the investigations?

ANSWER: Indeed research is necessary. It is the basis of all control methods. Until the corn borer is brought under adequate control, and is no longer a menace to the corn crop of the United States, the study of the corn borer and means of control must be kept up.

The best trained specialists in the country, State specialists as well as Federal specialists; entomologists, agricultural engineers, agronomists, and other agricultural scientists are employed in investigations of corn borer problems. They are studying, and will continue to study the life history, habits, and relation of the corn borer to environment; the breeding of varieties of corn adapted to borer conditions, the development of parasites of the borer, and the improvement of machinery for mechanical control.

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ANNOUNCEMENT: This closes the eighth of Station________'s weekly talks concerning the problems of LIVING WITH THE CORN BORER. The ninth and final talk will come next week at this period. It will review the results of the 1927 campaign, and give the most recent available information about the 1928 organized drive to control the borer.

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